HBNI Alumni Webinar

Friday,
21 November 2025
at 4:00 PM

Venue :- HBNI Council Hall, 2nd Floor, Training School Complex, Anushaktinagar, Mumbai

Link of : -

YouTube:
https://youtube.com/live/b3b90TMffz0

Webex:
https://hbni.webex.com/hbni/j.php?MTID=mfac0194083c788267c5478c1384fdfbd

Dr. Shyam Sundar

Assistant Professor
Institute of Physics (IF)
Federal University of Rio de Janeiro (UFRJ) Rio de Janeiro, Brazil

"Application of spin-polarized Muons in Condensed Matter Physics Research"

Dr Shyam Sundar did his graduation from Bareilly and obtained Master's degree in Physics in 2010 from Banaras Hindu University (BHU), Varanasi. He received his PhD from HBNI-RRCAT on understanding superconductivity in binary Mo-Re alloys in the year 2016. He pursued a postdoctoral position at the Federal University of Rio de Janeiro (UFRJ), Brazil during 2016-2018, where he studied vortex dynamics in high-Tc iron-pnictide superconductors. In 2018, he joined Simon Fraser University, Canada, for another postdoctoral fellowship, where he used the muon spin relaxation (μSR) technique to study superconductivity and magnetism in quantum materials. In 2022, he joined University of St Andrews, Scotland (UK), for another postdoctoral position, where he explored how uniaxial pressure can tune the electronic and magnetic behaviour of quantum materials. He joined as a Visiting Professor at the Federal University of ABC (UFABC), Brazil in January 2024. Since August 2025, he has been serving as an Assistant Professor at the Federal University of Rio de Janeiro (UFRJ), Brazil. His research interests focus on investigating quantum materials exhibiting superconductivity, magnetism, topological insulators, and heavy-Fermion systems, particularly through low-temperature measurements and μSR techniques.

Abstract

Muon spin relaxation/rotation/resonance (μSR) is a powerful and unique technique for probing magnetic interactions and dynamics in quantum materials. Additionally, μSR has proven useful in the study of semiconductor physics, chemical reaction kinetics, hydrogen isotopes, and free radical systems in chemistry. This technique leverages nearly 100% spin-polarized muons implanted into a sample to study their subsequent precession, relaxation, and resonance, which reveal critical information about the material's properties of interest via detecting the positron from muon decay.

In this seminar, I will provide a brief introduction to the μSR technique, detailing the various experimental configurations and methodologies employed. Moreover, through specific case studies, I will illustrate the diverse range of physical phenomena that μSR can investigate, including magnetic order, superconductivity, and spin dynamics. This presentation aims to provide a comprehensive overview of μSR technique and its invaluable role in advancing our understanding of quantum materials.

All are cordially invited for in person attendance